



With the addition of this 91,000-square-foot testing and demonstration facility in August 2012, the Energy and Environment Science and Technology Directorate will increase its available R&D laboratory space to nearly a quarter of a million square feet.

Energy Systems Laboratory

The soon-to-be constructed testing and demonstration facility, will serve as the new Energy Systems Laboratory when INL's operating lease begins in August 2012.

INL has a long and well-known history of engineering design and testing services in fields from bioenergy to nuclear energy, ranging in scope from laboratory-scale prototypes to full-scale operations. The laboratory is also known for its multidiscipline scientific, engineering and project management capabilities and successful history of developing first-of-their-kind systems and testing protocols to resolve energy and environmental challenges.

The purpose of leasing this facility is to provide work space and tools to principal investi-

gators that conduct research and development to reduce technical and economic risks associated with the deployment of new energy technologies. This support infrastructure will facilitate moving new energy security concepts from the realm of scientific and engineering investigation to the marketplace of commercially scalable and economically driven industrial processes and new consumer products.

Three related energy system programs will use the majority of the space, including Biofuels and Renewable Energy, Energy Storage and Transportation and Hybrid Energy Systems Testing.

Biofuels and Renewable Energy Program

INL and the Department of Energy recognize that a spec-

trum of energy sources will play key roles in the energy security of the United States. An important element of this strategy is using biomass feedstocks as primary fuel sources. INL is the research and development technical leader for developing bioenergy feedstock supply systems.

The goal of INL's program is to overcome key technical barriers facing the U.S. bioenergy industry by systematically researching, characterizing, modeling, demonstrating and harnessing the physical and chemical characteristics of the nation's diverse agricultural and forest biomass resources to more cost-effectively produce biofuels and other value-added products.

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The Energy of Innovation



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Creating a uniform format biomass feedstock commodity on a national scale brings with it a spectrum of challenges—one of the toughest being how to densify products to make them commercially viable to store and to transport—especially since this material is vulnerable to degradation due to weather, insects, bacterial actions and other mechanisms. To elevate this material as a significant component of the national energy mix, biomass must be gathered, processed and handled in a manner that results in an economically viable net energy gain.

INL's feedstock supply goal is to transform a wide variety of biomass materials into easily handled and transportable commodities. One of the major requirements of this enormous task is to have sufficient space and height for the large equipment and machinery required to conduct the necessary RD&D.

Advanced bioenergy feedstock supply research, development and demonstration also requires significant laydown or storage areas, which this new facility provides. One new wing of the facility will provide approximately 27,000 square feet of high-bay space (40-foot ceilings) and approximately four acres of outside laydown and storage space for the Bioenergy Program.

Energy Storage and Transportation Systems

Advanced batteries that live longer, are safer and more cost effective are critical to the nation's longterm goals to deploy large numbers of electric drive vehicles. INL's energy storage

program plays a critical role in meeting this challenge through applied research, development and diagnostic testing. The new High Energy Battery Test Facility at INL will significantly expand the DOE's ability to evaluate new battery technologies under development for automotive applications. INL is a lead DOE laboratory for this function—and is operating at full capacity—supporting battery research and development sponsored by DOE's Vehicle Technologies Program.

The rapidly growing demand, research and testing support on advanced batteries emphasize the need for more energy storage R&D space at INL. This new facility will add another 11,000 square feet of high-bay battery testing lab space dedicated to the DOE battery program.

Hybrid Energy Systems Testing (HYTEST) Program

The third occupant to be housed within the new facility is an INL program focused on hybrid energy system concepts and disparate energy system component testing known as HYTEST, or Hybrid Energy Systems Testing. Hybrid energy systems take advantage of the complementary characteristics of different energy sources—such as renewable, conventional and unconventional fossil, and nuclear sources—to gain efficiencies through advanced integrated system controls and engineering technologies that improve a given system's or process' environmental and energy performance. Researching hybrid approaches in this new lab can also be used to significantly expand the application for new nuclear reactor technology beyond electricity.

A significant purpose of the HYTEST lab is to reduce both technical and economic risks associated with energy systems of the future. This lab will provide configuration-flexible facilities to conduct experimental laboratory, bench-, pilot- and engineering-scale research and testing necessary to demonstrate commercial readiness of integrated energy systems. The lab will provide dedicated test platforms to demonstrate the specifications necessary to carry hybrid energy system concepts through the right levels of technology readiness required for commercialization.

Experiments in this facility will acquire performance data, identify scalability issues, quantify technology gaps and needs for various hybrid or other energy systems, and provide infrastructure to develop solutions in each of five energy-related platforms:

- Resource Extraction and Feedstock Processing
- Heat Transfer/Energy Integration
- Product Synthesis and Energy Storage
- By-Product Capture and Management, and
- Process Monitoring, Diagnostics and Control.

To accommodate the robustness of testing protocols, 16,000 square feet will be available in this building for HYTEST purposes.

For more information

Technical Contact

Joseph Henscheid

(208) 526-3672

joseph.henscheid@inl.gov

Communication Liaison

Reuel Smith

(208) 526-3733

reuel.smith@inl.gov

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